



USSN 10/088,658
OKADA et al.

AMENDMENT

IN THE CLAIMS

Please amend the claims as indicated in Appendix A submitted herewith according to the revision to 37 C.F.R. § 1.121 concerning a manner for making claim amendments.

REMARKS

Prior to the enclosed amendment, claims 1-14, 16-23, 25-28 and 30-36 were pending in the captioned application. Subject to the enclosed amendment, claims 1-2, 4-7, 9-12, 14, 16-17, 19-21, 23, 25, 27-28 and 30-36 are presently pending.

Claims 1, 6, 11, 16, 20, 25 and 33-36 are currently amended.

Claims 2, 4-5, 7, 9-10, 12, 14, 17, 19, 21, 23, 27-28 and 30-32 are pending as originally filed.

Claims 3, 8, 13, 15, 18, 22, 24, 26 and 29 are canceled.

Independent claims 1, 6, 16 and 25 and dependent claims 33-34 have been amended to contain the limitations of hydrotalcite particles having a platy crystal particle shape having an average aspect ratio of 1.7 to 8 being dispersed in the organic polar solvents of dimethylformamide (DMF), dimethylacetamide (DMAC), dimethyl sulfoxide (DMSO) and N-methylpyrrolidone (NMP). Support

for the particle shape can be found in dependent claim 3. Support for the organic polar solvents can be found in the specification at page 9, lines 25-27.

Independent claims 11 and 20 have been amended to contain the limitation of hydrotalcite particles having a platy crystal particle shape having an average aspect ratio of 1.7 to 8. Support can be found in claim 3.

Dependent claims 35-36 have been amended to change their dependencies and as to matters of form.

No new matter within the meaning of § 132 has been added by any of the amendments.

Accordingly, Applicants respectfully request the Examiner to enter the indicated amendments of Appendix A, withdraw the outstanding rejections in view of the arguments and amendments and allow all presently pending claims.

1. Rejection of Claims 1, 3-5, 25-28, 30-32 and 35-36
under 35 U.S.C. § 102(b)

The Office Action rejects claims 1, 3-5, 25-28, 30-32 and 35-36 under 35 U.S.C. § 102(b) as being anticipated by EP 301509 A1 ("Miyata et al."). The Office Action states:

Miyata discloses the instantly claimed dispersions using the instantly claimed hydrotalcite and their use in polymers including polyamides to give films with good

antiblocking characteristics. See the abstract; page 3, lines 10-19, 44-47, and 58; page 4, lines 1-7, 17-24, and 42-58 of which the alcohols are polar organic solvents; page 5, lines 35 and 48-51; page 8, lines 31-40, particularly Sample B; and the remainder of the document. Given the other parameters of the hydrotalcite of the reference, it would appear that the reference hydrotalcite having the other properties of the instant claims would necessarily and inherently possess the instantly claimed aspect ratio of claims 3, 26 and 32.

Applicants respectfully traverse the rejection because Miyata et al. fails to teach the newly added limitations of hydrotalcite particles having a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8 wherein the hydrotalcite particles are dispersed in organic polar solvents selected from the group of DMF, DMAC, DMSO or NMP. Miyata et al. also fails to teach the homogenous and stable dope of independent claims 6 and 16, or the polyurethane fiber or aromatic polyamide film of claims 11 and 20, or the hydrotalcite particles of claim 25 made from the dispersion of claim 1.

Turing to the rule, an anticipation rejection under § 102(b) requires that each and every element of the claimed invention be disclosed in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of California, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Those elements must be expressly disclosed as in the claim. In re Bond, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990).

In the present application, representative independent claim 1 recites a dispersion, comprising:

(A) hydrotalcite compound particles having

(1) an average secondary particle diameter of 0.60 to 3 μm as measured by a laser beam diffraction scattering method,

(2) a specific surface area of 0.5 to 10 m^2/g as measured by a BET method, and

(3) a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8, and

(B) an organic polar solvent which is at least one selected from the group consisting of dimethylformamide (DMF), dimethylacetamide (DMAC), dimethyl sulfoxide (DMSO) and N-methylpyrrolidone (NMP).

Miyata et al. clearly fails to teach each and every one of the presently claimed limitations. In particular, Miyata et al. fails to teach a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8 and an organic polar solvent which is at least one selected from the group consisting of DMF, DMAC, DMSO and NMP.

Miyata et al. also fails to inherently teach the presently

claimed platy crystal particle shape having an average aspect ratio of 1.7 to 8. Instead, Miyata et al. discloses hydrotalcite particles having an average secondary particle diameter of 1 to 8 μm (claim 1) and a BET specific surface area of 50 m^2/g or less (claim 2) wherein the particles of Miyata et al. have a spherical shape and intense coagulation.

In particular, Miyata et al. teaches that secondary particles are "in **coagulated** condition as close to **sphere** as possible with intense coagulation of primary particles crystals of hydrotalcite . . ." See Miyata et al. at page 3, lines 44-45. Miyata et al. continues that "when the BET specific surface area is too great, they go no good compatibility [sic] with the resin and further coagulate in the resin for formation of coarse particles. . . " See id. at page 4 lines 1-3.

This distinction between the particles of Miyata et al. and those of the presently claimed invention are notable because hydrotalcite particles have low compatibility with the presently claimed solvents of DMF, DMAC, DMSO and NMP. To overcome this problem, prior art techniques subject hydrotalcite particles to a wet grinding treatment to obtain a fine powder. The fine powder is then dispersed in a solvent.

In contrast, the presently claimed hydrotalcite particles having the presently claimed properties can be stably dispersed by

simply mixing them in any of the claimed organic polar solvents. A wet grinding treatment step is not required.

Given that one of the primary purposes of the presently claimed invention is to provide a dispersion having stable dispersability, it is clear that the particles of Miyata et al. fail to inherently possess the presently claimed properties of a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8.

Other teachings of Miyata et al. also indicate that the presently claimed hydrotalcite particles are not inherently disclosed by the reference. In particular, Miyata et al. teaches that hydrotalcite particles are directly kneaded with a resin by an extruder to obtain a pellet. See Examples 1 to 6. Notably, Miyata et al. fails to disclose that hydrotalcite particles are dispersed in a solvent to obtain a homogeneous dispersion and that a polymer (resin) is added to the dispersion. Miyata et al.'s silence on dispersions speaks volumes to the lack of any inherent teachings regarding the presently claimed features of the hydrotalcite particles.

Applicants further note that Miyata et al. also fails to teach the presently claimed solvents DMF, DMAC, DMSO or NMP. Although Miyata et al. teaches the use of alcohols, the alcohols are used in a method of surface-treating the hydrotalcite particles with a

surface-treating agent rather than being used as a solvent for dispersion. See Miyata et al. at page 3, lines 42-58. In particular, the alcohols of Miyata et al. are used to surface treat the particles, which are then dehydrated and used as solid particles. Id. at page 8, lines 26-30. In other words, the alcohols disclosed by Miyata et al. have nothing to do with obtaining a homogeneous dispersion.

Turning to claims 6 and 11, Applicants note that claim 6 is directed to a dope prepared by adding polyurethane to the dispersion of claim 1. The dope of claim 6 can be used for the dry or wet production of a polyurethane article (fiber) wherein the resulting polyurethane fiber is the subject matter of claim 11.

Notably, the dope of claim 6 is a stable dope containing the hydrotalcite particles of claim 1 uniformly dispersed therein with polyurethane. The resulting polyurethane fiber obtained from the stable dope of claim 6 demonstrates remarkable chlorine and thermal deterioration resistance. The effect of the dope of claim 6 is attained by combining the presently claimed organic polar solvent with the presently claimed hydrotalcite particles having a platy crystal particle shape and having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8.

Although Miyata et al. provides a list of many kinds of polymers as the resin, the reference nevertheless fails to teach

the presently claimed polyurethane of claim 6. See id. at page 5, lines 35-49. Notably, the polymers of Miyata et al. are necessarily melt-kneaded with hydrotalcite particles due to mixing of the particles with a resin during melt kneading. Hence, the melt spinning (or extrusion) of polyurethane and aromatic polyamide is generally not carried out with the polymers of Miyata et al. In contrast, the polyurethane and aromatic polyamide of the present invention are dispersed or dissolved in a solvent and can be used for the dry or wet production of a film or fiber. Miyata et al. clearly fails to teach a dope used for dry or wet production and a film or fiber produced from said dope.

With regard to claim 16, Applicants note that Miyata et al. also fails to teach the presently claimed aromatic polyamide of claim 16. Although Miyata et al. generally teaches "polyamide resin such as nylon 6, nylon 66 and the like", the reference fails to expressly teach aromatic polyamide as is required in a proper § 102(b) anticipation rejection. See id. There is also no indication of aromatic polyamides being taught inherently by the reference.

Clearly, Miyata et al. fails to expressly or inherently teach each and every one of the presently claimed limitations of the independent claims.

Accordingly, Applicants respectfully submit that the presently

claimed invention is not anticipated by Miyata et al. and request the Examiner to reconsider and withdraw the § 102(b) rejection.

2. Rejection of Claims 1-14, 16-23, 25-28 and 30-36
under 35 U.S.C. § 103(a)

The Office Action rejects claims 1-14, 16-23, 25-28 and 30-36 under 35 U.S.C. § 103(a) as being unpatentable over EP 301509 A1 ("Miyata et al.") in view of EP 952189 A1 ("Kazuki et al."). The Office Action states:

Miyata discloses the instantly claimed dispersions using the instantly claimed hydrotalcite and their use in polymers including polyamides to give films with good antiblocking characteristics. See the abstract; page 3, lines 10-19, 44-47, and 58; page 4, lines 1-7, 17-24, and 42-58 of which the alcohols are polar organic solvents; page 5, lines 35 and 48-51; page 8, lines 31-40, particularly Sample B; and the remainder of the document. Given the other parameters of the hydrotalcite of the reference, it would appear that the reference hydrotalcite having the other properties of the instant claims would necessarily and inherently possess the instantly claimed aspect ratio of claims 3, 26 and 32.

It would have been obvious to one of ordinary skill in the art at the time of the instant invention to use the hydrotalcites of the prior art in a dispersion having the amount of the instant claim 2 because it is within the ability of the ordinary skilled artisan to determine the amount of hydrotalcite which can be stably dispersed in the alcohol of Miyata and maximize the amount of hydrotalcite in the dispersion for economic reasons which will be clear to the ordinary skilled artisan,

including but not limited to minimizing the amount of EPA controlled, expensive organic solvents. No unexpected results are seen from the amounts of the instant claim 2. It would have been obvious to one of ordinary skill in the art at the time of the instant invention to use the hydrotalcite of Miyata in the instantly claimed aromatic polyamides because they are disclosed for use in polyamides generically and in aromatic polyesters. It is therefore not seen that they would not be compatible with aromatic polyamides and give their known useful properties to these polymer articles containing aromatic polyamide. It would have been obvious to one of ordinary skill in the art at the time of the instant invention to use the hydrotalcite of Miyata in the instantly claimed polyurethanes because they are disclosed for use in thermoplastic synthetic resins generically, of which polyurethanes are well known, and the ordinary skilled artisan would have expected the improved blocking disclosed by Miyata along with the excellent film properties of polyurethanes. It is noted that polyurethanes are a very wide category of polymers as they may be based on almost any other polymer such as polyolefins, polyacrylates, polyesters, polyamides, polyethers, etc. The compatibility with polymers disclosed by Miyata ensures that these hydrotalcites will be compatible with some polyurethane, such as those based on the polymers of Miyata. It would have been obvious to one of ordinary skill in the art at the time of the instant invention to make either films or fibers from these compounds because Kazuki shows such hydrotalcite filled polymers to be useful for all molded articles. Therefore, the known benefits of hydrotalcites would have been expected in both the films and fibers of the instant claims and those encompassed by the prior art. Antiblocking would be useful in fibers because they are in fact narrow films.

Applicants respectfully traverse the rejection because a *prima facie* case of obviousness has not been established. Both the Miyata et al. and Kazuki et al. reference fail to teach the newly added limitations of hydrotalcite particles having a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8 wherein the hydrotalcite particles are dispersed in organic polar solvents selected from the group of DMF, DMAC, DMSO or NMP. The cited references also fail to teach the homogenous and stable dope of independent claims 6 and 16, or the polyurethane fiber or aromatic polyamide film of claims 11 and 20, or the hydrotalcite particles of claim 25.

Moreover, both of the cited references fail to provide any suggestion or motivation to one of ordinary skill in the art to make a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8. The unexpected result of such particles is a dispersion having hydrotalcite particles being stably dispersed in organic polar solvents selected from the group of DMF, DMAC, DMSO or NMP as well a desirable dope for the production of polyurethane fiber having remarkable chlorine and thermal deterioration resistance.

Turning to the rule, the Federal Circuit held that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation

of success; and (3) that the prior art references teach or suggest **all** the claimed limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

In the present application, representative independent claim 1 recites a dispersion, comprising:

(A) hydrotalcite compound particles having

(1) an average secondary particle diameter of 0.60 to 3 μm as measured by a laser beam diffraction scattering method,

(2) a specific surface area of 0.5 to 10 m^2/g as measured by a BET method, and

(3) a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8, and

(B) an organic polar solvent which is at least one selected from the group consisting of dimethylformamide (DMF), dimethylacetamide (DMAC), dimethyl sulfoxide (DMSO) and N-methylpyrrolidone (NMP).

Miyata et al. clearly fails to teach each and every one of the presently claimed limitations. In particular, Miyata et al. fails to teach a platy crystal particle shape having an average aspect

ratio (major axis diameter/thickness) of 1.7 to 8 and an organic polar solvent which is at least one selected from the group consisting of DMF, DMAC, DMSO and NMP.

Similarly, Kazuki et al. also fails to teach a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8 and an organic polar solvent which is at least one selected from the group consisting of DMF, DMAC, DMSO and NMP.

Turning first to Miyata et al., Applicants note that the reference discloses hydrotalcite particles having an average secondary particle diameter of 1 to 8 μm (claim 1) and a BET specific surface area of 50 m^2/g or less (claim 2) wherein the particles of Miyata et al. have a spherical shape and intense coagulation. In particular, Miyata et al. teaches that secondary particles are "in **coagulated** condition as close to **sphere** as possible with intense coagulation of primary particles crystals of hydrotalcite" See Miyata et al. at page 3, lines 44-45. Miyata et al. continues that "when the BET specific surface area is too great, they go no good compatibility [sic] with the resin and further coagulate in the resin for formation of coarse particles. . . ." See id. at page 4 lines 1-3.

This distinction between the particles of Miyata et al. and those of the presently claimed invention are notable because

hydrotalcite particles have low compatibility with the presently claimed solvents of DMF, DMAC, DMSO and NMP. To overcome this problem, prior art techniques subject hydrotalcite particles to a wet grinding treatment to obtain a fine powder. The fine powder is then dispersed in a solvent.

In contrast, the presently claimed hydrotalcite particles having the presently claimed properties can be stably dispersed by simply mixing them in any of the claimed organic polar solvents. A wet grinding treatment step is not required. Given that one of the primary purposes of the presently claimed invention is to provide a dispersion having stable dispersability, it is clear that the particles of Miyata et al. fail to inherently possess the presently claimed properties of a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8.

Miyata et al. also teaches away from the presently claimed invention insofar as disclosing that the hydrotalcite particles of Miyata et al. are directly kneaded with a resin by an extruder to obtain a pellet. See Examples 1 to 6. In contrast, the dispersion of the invention contains hydrotalcite particles uniformly dispersed in a solvent to obtain a homogeneous dispersion.

Applicants further note that Miyata et al. also fails to teach the presently claimed solvents DMF, DMAC, DMSO or NMP. Although

Miyata et al. teaches the use of alcohols, the alcohols are used in a method of surface-treating the hydrotalcite particles with a surface-treating agent rather than being used as a solvent for dispersion. See Miyata et al. at page 3, lines 42-58. In particular, the alcohols of Miyata et al. are used to surface treat the particles, which are then dehydrated and used as solid particles. Id. at page 8, lines 26-30. In other words, the alcohols disclosed by Miyata et al. have nothing to do with obtaining a homogeneous dispersion.

Turning to claims 6 and 11, Applicants note that claim 6 is directed to a dope prepared by adding polyurethane to the dispersion of claim 1. The dope of claim 6 can be used for the dry or wet production of a polyurethane article (fiber) wherein the resulting polyurethane fiber is the subject matter of claim 11.

Notably, the dope of claim 6 is a stable dope containing the hydrotalcite particles of claim 1 uniformly dispersed therein with polyurethane. The resulting polyurethane fiber obtained from the stable dope of claim 6 demonstrates remarkable chlorine and thermal deterioration resistance. The effect of the dope of claim 6 is attained by combining the presently claimed organic polar solvent with the presently claimed hydrotalcite particles having a platy crystal particle shape and having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8.

Although Miyata et al. provides a list of many kinds of polymers as the resin, the reference nevertheless fails to teach the presently claimed polyurethane of claim 6. See id. at page 5, lines 35-49. Notably, the polymers of Miyata et al. are necessarily melt-kneaded with hydrotalcite particles due to mixing of the particles with a resin during melt kneading. Hence, the melt spinning (or extrusion) of polyurethane and aromatic polyamide is generally not carried out with the polymers of Miyata et al. In contrast, the polyurethane and aromatic polyamide of the present invention are dispersed or dissolved in a solvent and can be used for the dry or wet production of a film or fiber. Miyata et al. clearly fails to teach a dope used for dry or wet production and a film or fiber produced from said dope.

With regard to claim 16, Applicants note that Miyata et al. also fails to teach the presently claimed aromatic polyamide of claim 16. Although Miyata et al. generally teaches "polyamide resin such as nylon 6, nylon 66 and the like", the reference fails to teach aromatic polyamide. See id.

Turning to Kazuki et al., Applicants note that the reference is limited to a flame retardant synthetic resin composition containing hydrotalcite particles in an amount of 10 to 80 wt% wherein the particles have an average secondary particle diameter of 2 μm or less and a BET specific surface area of 1 to 30 m^2/g

(claims 1 and 5). Kazuki et al. fails to teach a platy crystal particle shape having an average aspect ratio (major axis diameter/thickness) of 1.7 to 8 and an organic polar solvent which is at least one selected from the group consisting of DMF, DMAC, DMSO and NMP and also fails to provide any suggestion or motivation to make such limitations.

Although Kazuki et al. teaches a method of mixing a resin with hydrotalcite particles directly and kneading them together with a large variety of resins, Kazuki et al. nevertheless fails to teach the presently claimed polyurethane and aromatic polyamide of claims 6, 11 and 16. See Kazuki et al. at page 6, lines 16-35; and page 7, lines 5-11. Not surprisingly, Kazuki et al. is completely silent with respect to the dry or wet production of film, fibers or other articles made from a hydrotalcite dispersion.

Clearly, the cited references fail to establish a *prima facie* case of obviousness over the presently pending claims.

Accordingly, Applicants respectfully submit that the presently claimed invention is unobvious over the cited references and respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. § 103.

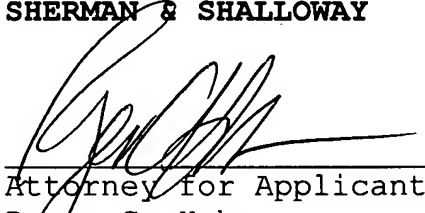
CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

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